REMARKS

Claims 29-30 and 32-49 are pending. Claims 1-28 and 31 have been cancelled. Claims 44-49 are new. Reconsideration of the application in view of the amended claims and remarks provided below is respectfully requested.

§103 Rejections

Paul in view of Leathers

The Examiner rejected Claims 29-43 under 35 U.S.C. § 103(a) as being unpatentable over US Patent 5,141,858 ("Paul") in view of US Patent 5,702,942 ("Leathers"). Applicants respectfully assert that the Examiner's modification of Paul's teachings is improper. Applicants further assert that the combination of Paul and Leathers is also improper.

The present invention of independent claim 29 recites a process for preparing a sweetener comprising combining sucrose, an acceptor molecule, and a glucansucrase enzyme so as to prepare a sweetener having at least 20% alpha 1-3 linkages and at least 20% alpha 1-6 linkages, wherein the ratio of sucrose to acceptor molecule is at least 8:1.

In the Office Action, the Examiner stated:

> [T]he donor (sucrose)-acceptor (maltose) reaction as taught by [Paul] needed to be modified by employing an alternansucrase source to produce the type of carbohydrates having α,1-3 and α,1-6 linkages as presently claimed. [Leathers] on the other hand discloses strain B-21297 as the source of the enzyme (alternansucrase) and clearly sets forth the advantage of using it to produce more alternan-type carbohydrates.
> Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to follow the teachings of [Paul] and make a modification of those teachings by replacing the enzyme source with the enzyme source taught by [Leathers]. One would do so to make alternan-type at a higher concentration. Such carbohydrates

are useful as low-glycemic, low calorie sweeteners which can be used in food and beverages.

(Office Action, pg. 5 emphasis added).

The Examiner has acknowledged that Paul does not disclose a process for producing an oligosaccharide with the claimed percentages of α,1-3 and α,1-6 linkages. The Examiner has sought to remedy this deficiency in Paul by modifying Paul's process. The Examiner has replaced Paul's enzyme source with an enzyme source which results in carbohydrates high in α,1-3 and α,1-6 linkages and lacking in α,1-2 linkages.

As described in Applicant's previous Office Action response, the ultimate aim and teaching of Paul is not only to create oligodextrans having α,1-2 linkages, but also to maximize the concentration of oligodextrans having α,1-2 linkages in the final product. It is well established in the art that oligodextrans with these α,1-2 linkages are non-digestible. As Paul describes, this quality of non-digestibility allows the product of Paul to be used as a filler or extender. Therefore, producing oligodextrans with α,1-2 linkages is an integral and critical feature of Paul. It would defeat the fundamental purpose of Paul to utilize an enzyme source which either produces oligodextrans with no α,1-2 linkages, or low percentages of α,1-2 linkages. The Examiner has proposed just such a modification of Paul.

The Examiner has proposed a modification of Paul which renders it unsatisfactory for its intended purpose. (See MPEP 2143.01 V.). Therefore, the Examiner's modification of Paul is improper. "If proposed modification would render the prior art invention unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." (MPEP 2143.01 V., citing *In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984)). The purpose of Paul is to create oligodextrans with α,1-2 bonds and to maximize the concentration of such oligodextrans. The Examiner suggests a modification to Paul which would result in oligodextrans which lack the very α,1-2 bonds which Paul explicitly states a desire for throughout its disclosure. Paul clearly

states that its intended purpose is to be "useful as fillers or extenders" and that it is precisely this property of containing α,1-2 linkages which makes which makes the oligodextran of Paul useful for such a purpose. (Paul, col. 2 , ll. 5-20). The Examiner's modification of Paul would result in a product without the very α,1-2 linkages which are intended by Paul. Consequently, examiner's modification of Paul is improper.

The combination of Paul and Leathers is also improper. "It is improper to combine references where the references teach away from their combination." (MPEP 2146 X. D. 2.) As described in the prior Office Action response and above, the ultimate purpose and teaching of Paul is not only to create oligodextrans having α,1-2 linkages, but also to maximize the concentration of oligodextrans having α,1-2 linkages in the final product. This purpose is explicitly disclosed repeatedly throughout Paul's disclosure. Such a purpose necessarily teaches away from using an enzyme source which does not produce α,1-2 linkages or produces few α,1-2 linkages.

Leathers relates to a method to identify microorganism strains that produce a high proportion of alternan to dextan, and produce a high proportion of alternansucrase to dextransucrase (enzymes which produce alternan an dextran respectively). Leathers describes a process in which these polysaccharides (alternan and dextran) are built on a nutrient medium. The purpose of Leathers is to select strains which produce high levels of alternan to dextran and have more alternansucrase than dextransucrase. Alternansucrase is an enzyme used to produce alternan. Thus, the ultimate aim of Leathers is to select strains which produce high proportions of alternan and have a high proportion of an enzyme which produces alternan. Alternan, by definition and as described in Leathers, is a polysaccharide which consists of alternating α-1-3 and α-1-6 linkages. Indeed, Leathers explicitly states that "[a]lternan is the name given to the unique α-D-glucan soluble glucose-polysaccharide in which alternating α-(1->6), α-(1->3) linkages predominate in the polysaccharide backbone." (Leathers, col. 1, ll. 22-25, emphasis added). A diagram of alternan is shown in FIG. 1 of Leathers

further demonstrates that α-1-3 and α-1-6 linkages predominate in the structure of alternan. Importantly, this diagram shows a lack of α-1-2 linkages.

Because the purpose of Paul is to produce oligodextrans with α-1-2 linkages, it would be contrary to that purpose to utilize the strain disclosed in Leathers which is useful in producing alternansucrase – an enzyme to produce alternan. In fact, Paul clearly teaches away from ever using such an enzyme source in its process which would result in a carbohydrate where α-1-3 and α-1-6 linkages predominate.

Because the Examiner's modification of Paul is improper and further because the combination of Paul and Leathers is also improper, Applicants respectfully submit that the present invention is patentable over Paul in view of Leathers.

Kossmann in view of Leathers

The Examiner also rejected Claims 29-43 under 35 U.S.C. § 103(a) as being unpatentable over WO 00/47727 ("Kossmann") in view of US Patent 5,702,942 ("Leathers"). Applicants respectfully assert that the combination of Kossmann and Leathers would not result in the claimed invention.

Applicants submit that Kossmann does not teach a process in which the ratio of sucrose to acceptor molecule is at least 8:1. The Examiner stated that "[Kossmann] discloses the ratio of sucrose concentration to maltose concentration in reactions where maltose is used as the acceptor molecule. (Example 2, In vitro preparation of alternan by means of protein extracts)." (Office Action, pg. 6). This example is the only location in Kossmann where a ratio of sucrose to acceptor molecule is listed. The ratio disclosed in Example 2 is approximately 1200:1 sucrose to maltose. Applicants respectfully assert that an ordinary skilled worker would appreciate that this is an obvious error in light of the remainder of Kossmann's disclosure.

At pages 4 and 11, Kossmann describes its process for producing oligoalternan. Kossmann does not disclose any sucrose to acceptor molecule ratios in the description, but rather refers the reader to an article: Lopez-Munguia et al, Enzyme Microb. Technol. 15 (1993), 77-85 ("Lopez-Munguia"). (See Kossmann, pg. 11). Lopez-Munguia does not disclose a process where the ratio of sucrose to acceptor molecule is greater than 4:1, nor does it contemplate the use of ratios greater than 4:1.

Since the disclosure of Example 2 would be seen as an obvious error, Kossman's teaching is limited to processes where the ratio of sucrose to acceptor molecule is 4:1 or less. In contrast, the present invention claims a process where the ratio of sucrose to acceptor molecule is greater than 8:1. Moreover, the present invention clearly sets forth the surprising advantages of utilizing this higher ratio of sucrose to acceptor molecule – advantages neither recognized nor contemplated by Kossmann, Lopez-Munguia, or Leathers.

The inventors of the present invention surprisingly discovered that a process utilizing greater that an 8:1 ratio of sucrose to acceptor molecule results in a sweetener which is fully caloric, and has a glucose release rate significantly reduced as compared to product made with a 4:1 ratio or less of sucrose to acceptor molecule. (See specification, pg. 13). Moreover, a process utilizing greater than 8:1 ratio of sucrose to acceptor molecule results in a sweetener which is much improved at lowering the glycemic index of a food product to which it is added. (See specification, pg. 15). These important benefits are neither recognized nor contemplated by Examiner's cited references.

Because the combination of Kossmann and Leathers does not result in the present invention, Applicants respectfully submit that the present invention is patentable over Kossmann in view of Leathers.

New Claims 44-49

Applicants note that new independent Claim 44 recites a process for preparing a sweetener wherein the ratio of sucrose to acceptor molecule is in the range of from 8:1 to 19:1. This range of ratios of sucrose to acceptor molecule resulting in a low glycemic sweetener having at least 20% alpha 1-3 linkages and at least 20% alpha 1-6 linkages are not disclosed by any of Examiners cited references. As such, Applicants respectfully request allowance of the new claims.

Conclusion

For at least these reasons, Applicants assert that the pending claims are patentable and respectfully request that the rejection under 35 U.S.C. § 103(a) be withdrawn.

Please apply any charges or credits to deposit account 50-2342.

Respectfully submitted,

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